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A Field-Book of the Stars. By WILLIAM T. OLcott. With Fifty Diagrams. New York and London: G. P. Putnam's Sons, 1907. Pp. xiii+163.

In a review published in the January issue of *School Science and Mathematics*, à propos of a certain mathematical geography, is the statement: "In many of the smaller high schools it (the mathematical geography) would furnish work more valuable and practical than the astronomy that still lingers in some of the courses." This statement, coming as it does from a high-school teacher of science, ought not to pass without challenge, because of two of its easy implications. One of the implications is that whatever "lingers" in the high school also *languishes*; and the other is that astronomy as a high-school study is in the course only by virtue of "lingering" there. If these implications were intended—and we trust they were not—the author of them was rather proselyting for a particular science than passing a calm judicial opinion on the relative merits of different branches of science for high-school study. The more discriminating judgment of experts of high-school education is in full accord with the position that the trouble with the old-time type of astronomy was with the way of teaching it to high-school pupils, and not at all with the suitability of the science, as such, to high-school purposes. It may be justly said that a course in high-school astronomy, made up of a judicious admixture of observational, laboratory, and mathematical work, might, so far as the educational interests of high-school boys and girls are involved, very well replace current courses in physiography, or be accepted as an eminently worthy substitute for the over-technical physics and chemistry that are too common with us today. A year's work, beginning with a half-year of general laboratory physics, followed by a half-year of laboratory and experimental astronomy, would be better suited to the needs of modern high-school pupils than any science course now in our high schools. The spirit and substance of no science is so well adapted to the needs of the short-sighted, self-centered, and imaginative adolescent youth as are those of astronomy, when methods of teaching it are truly scientific.

Indeed a good part of the nature-study of the elementary school should consist, and in not a few instances does now consist, of observational studies of the sun, moon, stars, and constellations. These things are quite as much a part of the environment of the life of elementary pupils as are the animals, plants, etc., that are studied, and consequently are quite as profitable subjects of study. They should be made a rational and an intelligent part of his environment. Merely because adults have grained into themselves the habit of ignorance and disregard of the most obvious objects and manifestations of the sky is not sufficient reason for keeping the children in ignorance. It is this field of ignorance that breeds so prolific a crop of current superstitions about the moon, the planets, the seasons, and the weather. To make children more neighborly with the stars and more rational about them will both deliver them from these empty superstitions, and afford them a source of life-long satisfaction.

This general work with astronomical objects should be followed up in the high school with a good observational and experimental course, with much reading based upon the experiments and observations. There should, moreover, be no childish fear of the mathematical bogey-man, where mathematics will do real service in explaining and clarifying astronomical truths. If teachers of high-school science would acquire enough expertness in elementary mathematics

to enable them to see a truth when it is expressed in mathematical language and thus to acquire a steadiness of mind when a formula of algebraic look stalks out before them, the mathematical element necessary to put fiber and sinew into science work would soon cease to be a bugaboo with us, as it has long ago ceased to be in the cultured countries of Europe.

But the *crux* of the difficulty of giving such astronomical work as is described above is the lack of suitable textbook literature. It is singular that nearly all the astronomical books whose titles profess to be directed to youthful audiences treat everything from the adult point of view. The authors seem to think they must interest the fathers and mothers of the boys and girls, first of all. Their books are written in adult language, on adult themes, and with adult treatments. They are in no proper sense boys' and girls' books on astronomy. The knowing publishers are sure that all the high schools need is a diluted college text, with now and then a difficulty cracked into somewhat smaller pieces. The pedagogics of the boy is based on the naïve theory that the boy is a smaller-mouthed man. The ambitious high-school teacher, eager to think of himself as teaching college boys and girls, is apt to want precisely this ultra-mature type of book, and the commercial publishers, anxious only for what will sell, work their wills none too regardful for the pedagogical interests involved. Excellent exceptions to the foregoing type of text are: Miss Eliza A. Bowen's *Astronomy by Observation* and Professor Wilson's and Miss Byrd's *Laboratory Astronomics*. Another notable exception is the little volume under review here.

For assistance in the geography of the heavens, and for choosing particular objects that are suitable for naked-eye or opera-glass study this little book is the most complete and the most practicable that has thus far appeared. Starting with the "Great Dipper" and the "Pleiades" as regions of references, the entire portion of the sky that is visible from the average latitude of New England and the Middle States is comprised in the charts and the descriptive text that accompany them. The subject is handled from the point of view of the stars of spring; of summer; of autumn; and of winter. Then come charts containing the most interesting objects of one, or of a few constellations of the seasonal maps, each chart facing a single page of concise descriptive matter for identifying and finding the objects depicted. It can hardly be claimed that either too much or too little descriptive matter is given.

The diagrams are simple, clear, and admirably adapted to class or individual use. Stars of the first magnitude, variables, and nebulae are indicated on the seasonal maps by characteristic symbols. On the several constellation charts fuller detail is given.

The book closes with brief chapters of only a few compact paragraphs on the planets; the milky way; motions of the stars; meteors and shooting stars; a glossary of about 25 pages on the names of the stars and their meanings. Pronunciations are also indicated. The book closes with a table of first-magnitude stars and a good index.

The author's work is excellently done. The book is timely and teachable, and there is little of moment in it to criticize. The publisher's part of the work is good. Every high-school teacher of astronomy ought to have it and to use it in his classes.

G. W. MEYERS

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